For Revised Syllabus Session 2024-25

# NCERT Solutions

## MATHS

Class 10

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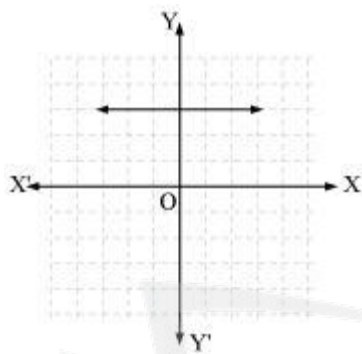
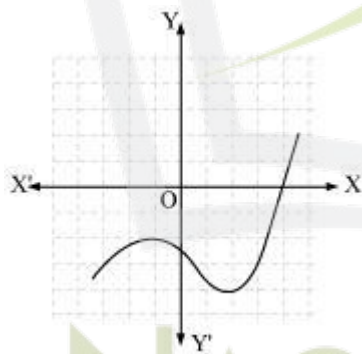
# Chapter 2 Polynomials

**EXERCISE 1.2**

**Question** 1:

The graphs of $y = p(x)$ are given in following figure, for some polynomials $p(x)$. Find the number of zeroes of $p(x)$, in each case.

(i)

(ii)

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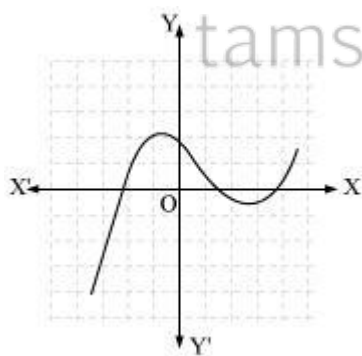
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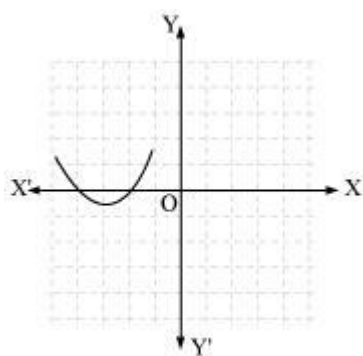
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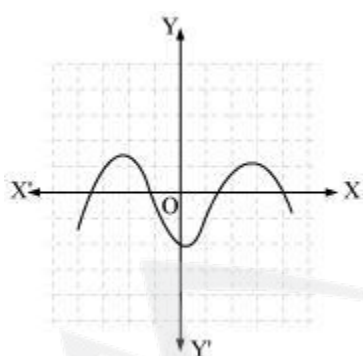
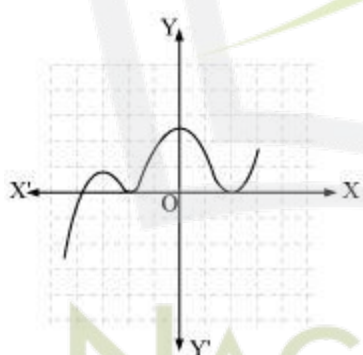

(vii)

**Answer**:

(i) The number of zeroes is 0 as the graph does not cut the *x*-axis at any point.

(ii) The number of zeroes is 1 as the graph intersects the *x*-axis at only 1 point.

(iii) The number of zeroes is 3 as the graph intersects the *x*-axis at 3 points.

(iv) The number of zeroes is 2 as the graph intersects the *x*-axis at 2 points.

(v) The number of zeroes is 4 as the graph intersects the *x*-axis at 4 points.

(vi) The number of zeroes is 3 as the graph intersects the *x*-axis at 3 points.

## Exercise 2.2

**Question** 1: Find the zeroes of the following quadratic polynomials and verify the relationship between the zeroes and the coefficients.

$(\text{i})\, x^2-2x-8 \quad (\text{ii})\, 4s^2-4s+1 \quad (\text{iii})\, 6x^2-3-7x$

$(\text{iv})\, 4u^2+8u \quad (\text{v})\, t^2-15 \quad (\text{vi})\, 3x^2-x-4$

**Answer**:

(i) $x^2-2x-8=(x-4)(x+2)$

The value of $x^2-2x-8$ is zero when $x$ − 4 = 0 or $x$ + 2 = 0, i.e., when $x$ = 4 or $x$ = −2

Therefore, the zeroes of $x^2-2x-8$ are 4 and −2.

Sum of zeroes = $4-2=2=\frac{-(-2)}{1}=\frac{-(\text{Coefficient of } x)}{\text{Coefficient of } x^2}$

Product of zeroes $=4\times(-2)=-8=\frac{(-8)}{1}=\frac{\text{Constant term}}{\text{Coefficient of } x^2}$

(ii) $4s^2-4s+1=(2s-1)^2$

The value of $4s^2-4s+1$ is zero when $2s$ − 1 = 0, i.e., $s=\frac{1}{2}$

Therefore, the zeroes of $4s^2-4s+1$ are $\frac{1}{2}$ and $\frac{1}{2}$.

Sum of zeroes = $\frac{1}{2}+\frac{1}{2}=1=\frac{-(-4)}{4}=\frac{-(\text{Coefficient of } s)}{(\text{Coefficient of } s^2)}$

Product of zeroes $=\frac{1}{2}\times\frac{1}{2}=\frac{1}{4}=\frac{\text{Constant term}}{\text{Coefficient of } s^2}$

(iii) $6x^2-3-7x=6x^2-7x-3=(3x+1)(2x-3)$

The value of $6x^2-3-7x$ is zero when $3x$ + 1 = 0 or $2x$ − 3 = 0, i.e., $x=\frac{-1}{3}$ or $x=\frac{3}{2}$

Therefore, the zeroes of $6x^2 - 3 - 7x$ are $\frac{-1}{3}$ and $\frac{3}{2}$.

Sum of zeroes = $\frac{-1}{3} + \frac{3}{2} = \frac{7}{6} = \frac{-(-7)}{6} = \frac{-(\text{Coefficient of } x)}{\text{Coefficient of } x^2}$

Product of zeroes = $\frac{-1}{3} \times \frac{3}{2} = \frac{-1}{2} = \frac{-3}{6} = \frac{\text{Constant term}}{\text{Coefficient of } x^2}$

(iv) $4u^2 + 8u = 4u^2 + 8u + 0$

$= 4u(u+2)$

The value of $4u^2 + 8u$ is zero when $4u = 0$ or $u + 2 = 0$, i.e., $u = 0$ or $u = -2$

Therefore, the zeroes of $4u^2 + 8u$ are 0 and −2.

Sum of zeroes = $0 + (-2) = -2 = \frac{-(8)}{4} = \frac{-(\text{Coefficient of } u)}{\text{Coefficient of } u^2}$

Product of zeroes = $0 \times (-2) = 0 = \frac{0}{4} = \frac{\text{Constant term}}{\text{Coefficient of } u^2}$

(v) $t^2 - 15$

$= t^2 - 0t - 15$

$= (t - \sqrt{15})(t + \sqrt{15})$

The value of $t^2 - 15$ is zero when $t - \sqrt{15} = 0$ or $t + \sqrt{15} = 0$, i.e., when $t = \sqrt{15}$ or $t = -\sqrt{15}$

Therefore, the zeroes of $t^2 - 15$ are $\sqrt{15}$ and $-\sqrt{15}$.



Sum of zeroes = $\sqrt{15} + (-\sqrt{15}) = 0 = \frac{-0}{1} = \frac{-(\text{Coefficient of } t)}{(\text{Coefficient of } t^2)}$

Product of zeroes = $(\sqrt{15})(-\sqrt{15}) = -15 = \frac{-15}{1} = \frac{\text{Constant term}}{\text{Coefficient of } x^2}$

(vi) $3x^2 - x - 4$

$= (3x - 4)(x + 1)$

The value of $3x^2 - x - 4$ is zero when $3x - 4 = 0$ or $x + 1 = 0$, i.e., when $x = \frac{4}{3}$ or $x = -1$

Therefore, the zeroes of $3x^2 - x - 4$ are $\frac{4}{3}$ and $-1$.

Sum of zeroes = $\frac{4}{3} + (-1) = \frac{1}{3} = \frac{-(-1)}{3} = \frac{-(\text{Coefficient of } x)}{\text{Coefficient of } x^2}$

Product of zeroes $= \frac{4}{3}(-1) = \frac{-4}{3} = \frac{\text{Constant term}}{\text{Coefficient of } x^2}$

**Question** 2:

Find a quadratic polynomial each with the given numbers as the sum and product of its zeroes respectively.

(i) $\frac{1}{4}, -1$ (ii) $\sqrt{2}, \frac{1}{3}$ (iii) $0, \sqrt{5}$

(iv) $1, 1$ (v) $-\frac{1}{4}, \frac{1}{4}$ (vi) $4, 1$

**Answer**:

(i) $\frac{1}{4}, -1$

Let the polynomial be $ax^2 + bx + c$, and its zeroes be $\alpha$ and $\beta$.

$\alpha + \beta = \frac{1}{4} = \frac{-b}{a}$

$\alpha\beta = -1 = \frac{-4}{4} = \frac{c}{a}$

If $a = 4$, then $b = -1$, $c = -4$

Therefore, the quadratic polynomial is $4x^2 - x - 4$.

(ii) $\sqrt{2}, \frac{1}{3}$

Let the polynomial be $ax^2 + bx + c$, and its zeroes be $\alpha$ and $\beta$.

$\alpha + \beta = \sqrt{2} = \frac{3\sqrt{2}}{3} = \frac{-b}{a}$

$\alpha\beta = \frac{1}{3} = \frac{c}{a}$

If $a = 3$, then $b = -3\sqrt{2}$, $c = 1$

Therefore, the quadratic polynomial is $3x^2 - 3\sqrt{2}x + 1$.

(iii) $0, \sqrt{5}$

Let the polynomial be $ax^2 + bx + c$, and its zeroes be $\alpha$ and $\beta$.

$\alpha + \beta = 0 = \frac{0}{1} = \frac{-b}{a}$

$\alpha \times \beta = \sqrt{5} = \frac{\sqrt{5}}{1} = \frac{c}{a}$

If $a = 1$, then $b = 0$, $c = \sqrt{5}$

Therefore, the quadratic polynomial is $x^2 + \sqrt{5}$.

(iv) 1, 1

Let the polynomial be $ax^2 + bx + c$, and its zeroes be $\alpha$ and $\beta$.

$\alpha + \beta = 1 = \frac{1}{1} = \frac{-b}{a}$

$\alpha \times \beta = 1 = \frac{1}{1} = \frac{c}{a}$

If $a = 1$, then $b = -1$, $c = 1$

Therefore, the quadratic polynomial is $x^2 - x + 1$.

(v) $-\frac{1}{4}, \frac{1}{4}$

Let the polynomial be $ax^2 + bx + c$, and its zeroes be $\alpha$ and $\beta$.

$\alpha + \beta = \frac{-1}{4} = \frac{-b}{a}$

$\alpha \times \beta = \frac{1}{4} = \frac{c}{a}$

If $a = 4$, then $b = 1$, $c = 1$

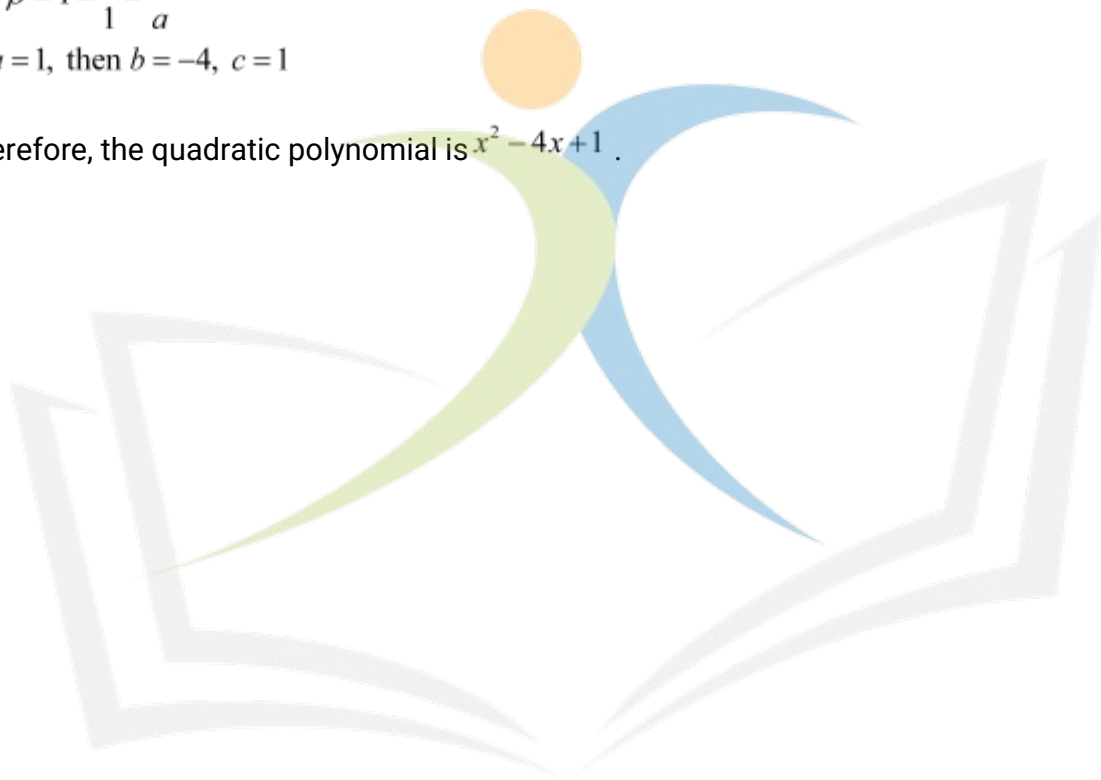
Therefore, the quadratic polynomial is $4x^2 + x + 1$ .

(vi) 4, 1

Let the polynomial be $ax^2 + bx + c$ .

$$\alpha + \beta = 4 = \frac{4}{1} = \frac{-b}{a}$$
$$\alpha \times \beta = 1 = \frac{1}{1} = \frac{c}{a}$$

If $a = 1$, then $b = -4$, $c = 1$

Therefore, the quadratic polynomial is $x^2 - 4x + 1$ .

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- **Access to Previous Years' Question Papers and Topper Answers:** The group provides access to previous years' question papers (PYQ) and exemplary answer scripts of toppers. This resource is invaluable for exam preparation, allowing individuals to familiarize themselves with the exam format, gain insights into scoring techniques, and enhance their performance in assessments.

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- **Timely Updates and Reminders:** SOE WhatsApp groups serve as a source of timely updates and reminders about important dates, exam schedules, syllabus changes, and academic events. Teachers can stay informed and well-prepared for upcoming assessments and activities.

- **Interactive Learning Environment:** Teachers can engage in discussions, ask questions, and seek clarifications within the group, creating an interactive learning environment. This fosters collaboration, peer learning, and knowledge sharing among group members, enhancing understanding and retention of concepts.

- **Access to Expert Guidance:** SOE WhatsApp groups are moderated by subject matter experts, teachers, or experienced educators can benefit from their guidance, expertise, and insights on various academic topics, exam strategies, and study techniques.

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**Team**
**School of Educators**

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## Secondary Groups (IX & X)

## Senior Secondary Groups (XI & XII For Teachers Only)

## Subject Wise Secondary and Senior Secondary Groups (IX & X For Students Only)

## Secondary Groups (IX & X)

## Senior Secondary Groups (XI & XII For Students Only)

# Groups Rules & Regulations:

**To maximize the benefits of these WhatsApp groups, follow these guidelines:**

1. Share your valuable resources with the group.
2. Help your fellow educators by answering their queries.
3. Watch and engage with shared videos in the group.
4. Distribute WhatsApp group resources among your students.
5. Encourage your colleagues to join these groups.

**Additional notes:**

1. Avoid posting messages between 9 PM and 7 AM.
2. After sharing resources with students, consider deleting outdated data if necessary.
3. It's a NO Nuisance groups, single nuisance and you will be removed.
   - No introductions.
   - No greetings or wish messages.
   - No personal chats or messages.
   - No spam. Or voice calls
   - Share and seek learning resources only.

**Please only share and request learning resources. For assistance, contact the helpline via WhatsApp: +91-95208-77777.**

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Artificial Intelligence

Beauty & Wellness

Design Thinking & Innovation

Financial Literacy

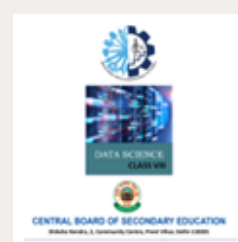
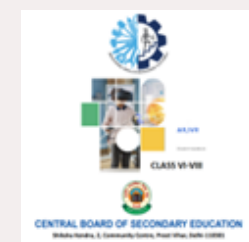
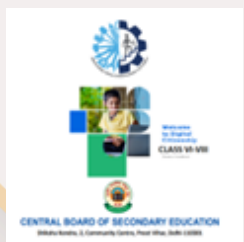
Handicrafts

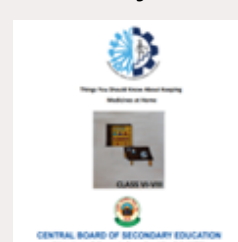
Information Technology

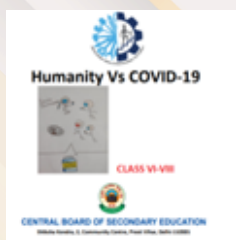
Marketing/Commercial Application

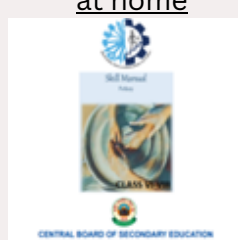
Mass Media - Being Media Literate

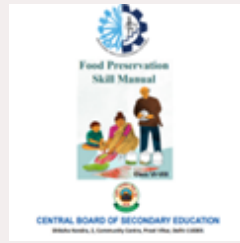
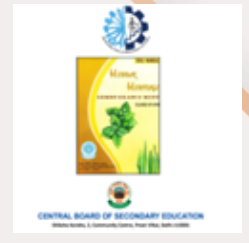
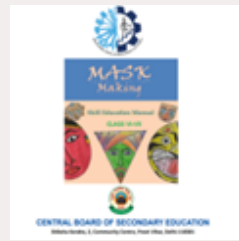
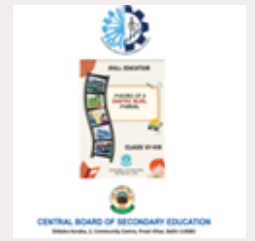
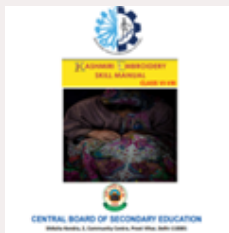
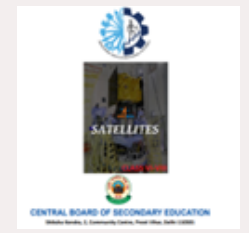
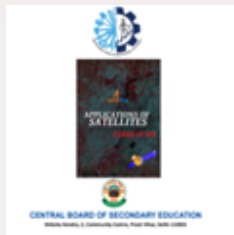
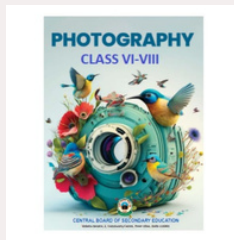
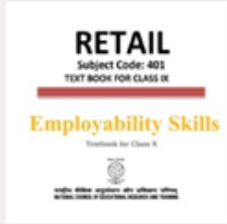
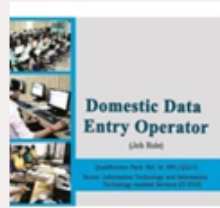
Travel & Tourism

Coding

Data Science (Class VIII only)

Augmented Reality / Virtual Reality

Digital Citizenship

Life Cycle of Medicine & Vaccine

Things you should know about keeping Medicines at home

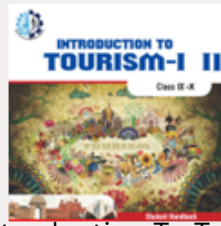
What to do when Doctor is not around

Humanity & Covid-19

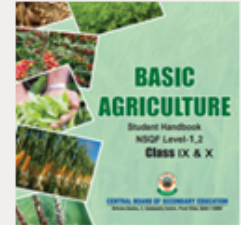
Blue Pottery

Pottery

Block Printing

# SKILL SUBJECTS AT SECONDARY LEVEL (CLASSES IX – X)

Retail

Information Technology

Security

Automotive

Introduction To Financial Markets

Introduction To Tourism

Beauty & Wellness

Agriculture

Food Production

Front Office Operations

Banking & Insurance

Marketing & Sales

Health Care

Apparel

Multi Media

Multi Skill Foundation Course

Artificial Intelligence

Physical Activity Trainer

Data Science

Electronics & Hardware (NEW)

Foundation Skills For Sciences (Pharmaceutical & Biotechnology)(NEW)

Design Thinking & Innovation (NEW)

# SKILL SUBJECTS AT SR. SEC. LEVEL (CLASSES XI – XII)

Retail

InformationTechnology

Web Application

Automotive

Financial Markets Management

Tourism

Beauty & Wellness

Agriculture

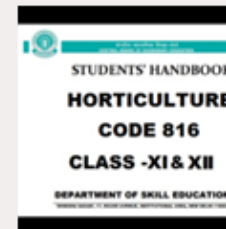
Food Production

Front Office Operations

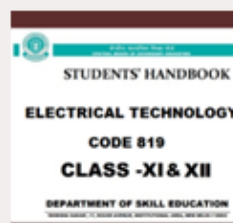
Banking

Marketing

Health Care

Insurance

Horticulture

Typography & Comp. Application

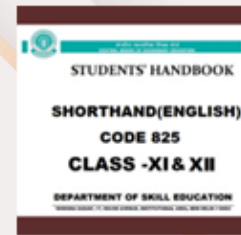
Geospatial Technology

Electrical Technology

Electronic Technology

Multi-Media

Taxation

Cost Accounting

Office Procedures & Practices

Shorthand (English)

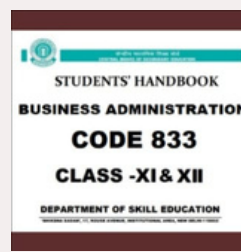
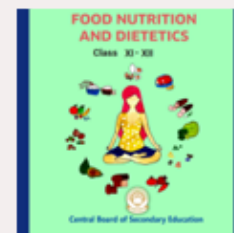
Shorthand (Hindi)

Air-Conditioning & Refrigeration

Medical Diagnostics

Textile Design

Design

Salesmanship

Business Administration

Food Nutrition & Dietetics

Mass Media Studies

Library & Information Science

Fashion Studies

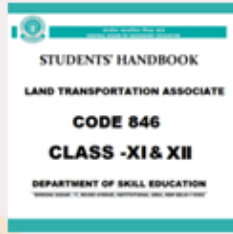
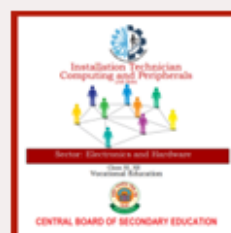
Applied Mathematics

Yoga

Early Childhood Care & Education

Artificial Intelligence

Data Science

Physical Activity Trainer(new)

Land Transportation Associate (NEW)

Electronics & Hardware (NEW)

Design Thinking & Innovation (NEW)

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## Kindergarten to Class XII

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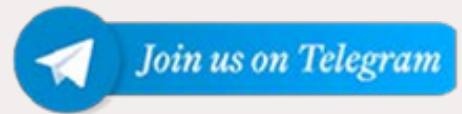
Class 2

Class 3

Class 4

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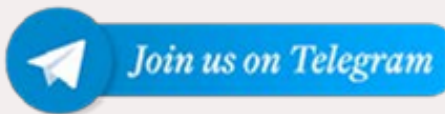
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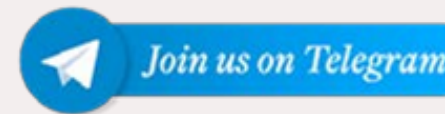
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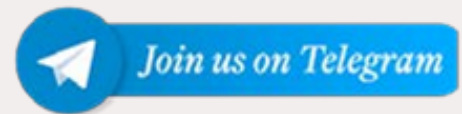
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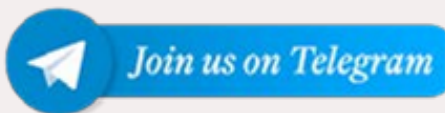
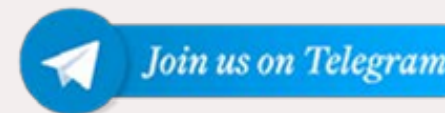
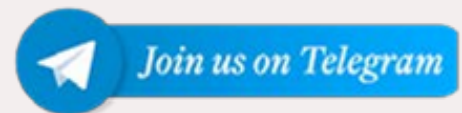
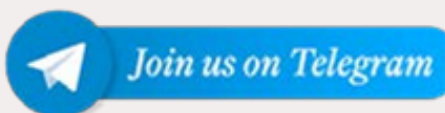
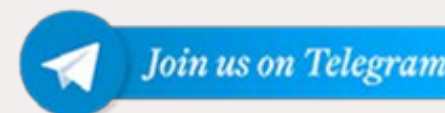
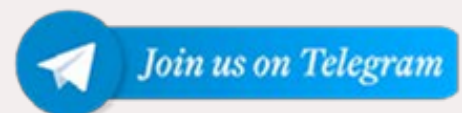
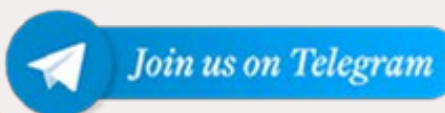
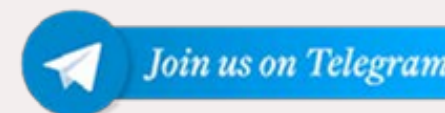
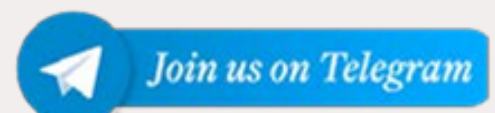
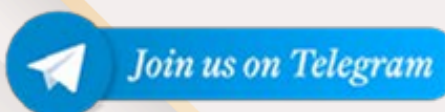

Class 9

Class 10

Class 11 (Science)

Class 11 (Humanities)

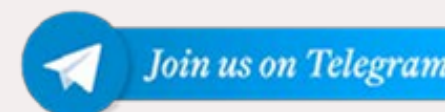
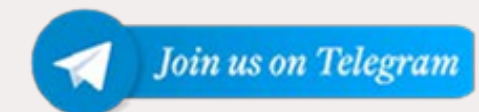
Class 11 (Commerce)

Class 12 (Science)

Class 12 (Humanities)

Class 12 (Commerce)

Kindergarten

Artifical intelligence

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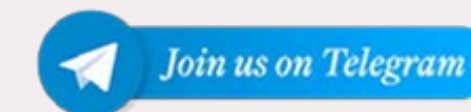
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